

REMARKS

The rejection of Claims 6, 7 and 17-30 over Claims 1-14 of U.S. Patent No. 5,526,643 (Mukaihira et al.) on grounds of obviousness-type double patenting is deemed overcome by the attached Terminal Disclaimer.

The rejection of Claims 17-28 as being anticipated by Kurihara et al. under 35 USC §102(e) is traversed, and reconsideration of that rejection is also respectfully requested. As reflected in the Interview Summary proposed by the Examiner after the personal interview with the undersigned and applicants' representative, Mr. Naonobu Tsutsumi, the differences between the Kurihara et al. patent and the present invention were considered. In addition, to make the record complete, applicants' representatives also discussed the Seki et al. patent which had been cited in said Mukaihira et al. patent so that a clear exposition of possibly relevant prior art was before the Examiner and fully distinguished. That discussion is also reflected in the Interview Summary, the differences being such that the claims of the application are allowable over Seki et al. as the claims of Mukaihira et al. were patentable over Seki et al.

At the outset, we would again point out that the prior art, including Kurihara et al. and Mukaihira et al., does not teach an apparatus or method in which a determination of the deterioration state of the catalyst is suspended if the value of a state variable is outside a predetermined range. More specifically, the Kurihara et al. patent involves a technique in which the catalyst deterioration is diagnosed by calculating the catalyst deterioration index using

the output signals from the air-fuel ratio sensor, then comparing this index with the predetermined value, and thereby determining the deterioration state of the catalyst. In other words, this technique uses an index calculation method with auto-correlation function, in contrast to the present invention which, as above noted, suspends the catalyst diagnosis within the predetermined range and modifies, no matter now calculated, the catalyst deterioration index value using the engine state. Activation of the catalyst occurs if the catalyst temperature stays within the activation range which can vary from system to system. An engine state variable, e.g. flow rate, is used to judge whether the catalyst remains within the specific actuation range and, if outside that range, to determine if suspension of the catalyst diagnosis is appropriate. Generally speaking diagnosis does not begin when the engine is in a cold state after the engine is started. This is not, however, a suspension of diagnosis because diagnosis has not begun in the predetermined range to correct the index, or correct the criterion value which has been used for the diagnosis with the index.

The suggestion in the Office Action that the Kurihara et al. patent discloses obtaining an index value indicative of the catalysts conversion efficiency and suspending a determination of the deterioration state if the state variable is outside a predetermined range is simply incorrect. Col. 6, lines 30-67; col. 7, lines 1-67; col. 8, lines 1-67 and col. 9, lines 1-20 provide no support for that suggestion. Those sections of the Kurihara et al. patent teach only the diagnosis of the deterioration state by comparing the index value and reference

value but provide no hint about the desirability of suspending the determination, a feature claimed in varying scope in Claims 17-28. We believe it fair to say that this difference was clearly understood by the Examiner at the personal interview.

Likewise, with or without a correction means, the subject matter of the claims of the application, like those of the Mukaihira et al. patent, is patentable over the Seki et al. patent which does not teach a suspension technique.

The Seki et al. system first estimates the catalyst temperature at a steady-state condition (i.e., the engine rotation is constant) and then corrects the catalyst deterioration determination level with this estimated catalyst temperature. Catalyst deterioration is thus diagnosed by comparing the catalyst deterioration value obtained by time periods TL (from a richer side to a leaner side) as well as TR (from a leaner side to a richer side) with the corrected deterioration determination value. No suspension whatsoever of the catalyst deterioration diagnosis occurs if the engine state variable is outside a predetermined range but only when the engine operation is not steady-state. In the present invention, however, suspension takes place independently of whether or not the engine is operating at constant rotation; suspension occurs only when the engine state variable is outside a predetermined value.

As a matter of fact, suspension of catalyst deterioration diagnosis will not occur in the Seki et al. system even after a value of the engine state variable exceeds a predetermined value until the engine is outside a steady-running

condition. Moreover, catalyst deterioration diagnosis would not take place even if the engine state variable did not exceed the predetermined range while the engine is not in a steady condition.

Other differences underlie the basic approach used in Seki et al. and in the present invention with or without correction means. For example, in the latter, the catalyst deterioration index is calculated by comparing the output waveforms of the sensors upstream and downstream of the catalyst. In Seki et al., the catalyst deterioration value is calculated by the time period of a leaner side and of a richer side which is an entirely different calculation.

In addition, Seki et al. calculates the level to determine the catalyst deterioration state by using the output from the downstream O₂ sensor, and not utilizing the sensors upstream and downstream to determine the catalyst deterioration. To the extent that the Seki et al. patent uses both the upstream and downstream sensors, it do so primarily for feedback control for the A/F ratio. The output from the sensors arranged upstream and downstream is basically used for feedback control of the air-fuel ratios.

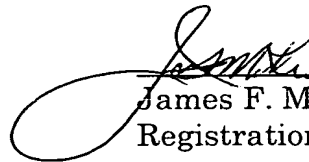
For the foregoing reasons, the rejection of Claims 17-28 under 35 USC §102(e), or even under Section 103(a), cannot be sustained. Early and favorable action is thus earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #381TO.41670C4).

Respectfully submitted,

May 27, 2004


James F. McKeown
Registration No. 25,406

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844

JFM:ast(310079)